

Project Narrative
Environmental Protection Agency (EPA)
2019 & 2020 TARGETED AIRSHED GRANT PROGRAM: RFA # EPA-OAR-OAQPS-20-01

Project Title: Switch-On: A Large-Scale Deployment of Zero Emission Freight Trucks

Applicant Name: South Coast Air Quality Management District

Address: 21865 Copley Drive Diamond Bar, CA 91765

Technical Contacts: Matt Miyasato, Ph.D. | Deputy Executive Officer
Tel: (909) 396-3249 | Fax: (909) 396-3252 | mmiyasato@aqmd.gov
Naveen Berry | Assistant Deputy Executive Officer
Tel: (909) 396-2363 | Fax: (909) 396-3252 | nberry@aqmd.gov
Joseph Impullitti | Technology Demonstration Manager
Tel: (909) 396-2025 | Fax: (909) 396-3252 | E-mail: jimpullitti@aqmd.gov
Patricia Kwon | Program Supervisor
Tel: (909) 396-3065 | Fax: (909) 396-3252 | E-mail: pkwon@aqmd.gov

Administrative Contact: Nancy Cole | Financial Analyst
Tel: (909) 396-2767 | E-mail: ncole@aqmd.gov

DUNS Number: 025986159

EPA Funding Requested: \$20,000,000

Voluntary Cost Share: \$10,080,000

Total Project Cost: \$30,080,000

Project Period: November 1, 2020 to March 31, 2024

Project Description: Switch-On: A Large-Scale Deployment of Zero Emission Freight Trucks will be the largest commercial deployment of Class 8 zero emission trucks to date from a single original equipment manufacturer (OEM), deploying seventy (70) heavy-duty battery electric trucks from Volvo Group North America (Volvo). The project builds upon the successes of the revolutionary Volvo LIGHTS (Low Impact Green Heavy Transport Solutions) demonstration underway in Southern California. Switch-On leverages expertise gained from Volvo LIGHTS and funding for community outreach and infrastructure improvements from the Mobile Source Air Pollution Reduction Review Committee (MSRC), Department of Energy (DOE), and other public agencies. More deployments are planned beyond the project period, and the Switch-On project alone will provide emission reductions in excess of 152.63 tons of NOx, 1.317 tons of PM2.5, and 53,160 tons of CO2.

Project Location: The project will take place in the Los Angeles-South Coast Air Basin Nonattainment Area for ozone and PM2.5. The new electric trucks will charge at facilities in Chino, Van Nuys, Riverside and Ontario and operate throughout disadvantaged communities (DACs) heavily impacted by diesel pollution in Los Angeles, Riverside, and San Bernardino Counties.



Work Plan

1. Project Summary and Approach: South Coast Air Quality Management District (South Coast AQMD) is partnering with Volvo Group North America (Volvo) to put forth a revolutionary project that will realize market penetration of heavy-duty battery electric trucks in California and throughout the nation. Volvo, a major heavy-duty OEM of Class 7, and Class 8 trucks, will be partnering with top fleet and industry leaders to reduce emissions at warehouses and freight facilities in the nation's most polluted areas for ozone, nitrogen oxides (NOx), and diesel particulate matter (DPM). This project is an extension of the first of its kind Volvo LIGHTS project, which created an integrated system of zero emission goods movement with Class 8 rigid trucks and tractors, charging infrastructure, solar, energy storage, and facility upgrades enabling minimized fleet costs and grid impacts in the South Coast Air Basin. The project also incorporated widespread community outreach, marketing, and workforce training to truly transform perceptions surrounding zero emissions and goods movement as a tangible goal for fleets in a variety of goods movement operations. Battery electric trucks provide significant emission reductions for California as they have the potential to eliminate heavy-duty diesel fuel use and tailpipe NOx emissions in applications that consume the greatest volume of diesel in the country.

Volvo Group North America and its subsidiary Volvo Technology of America, LLC (VTA) are adept at partnering with public entities to provide societal benefits in the transportation industry. VTA recently participated in projects with the Department of Energy (DOE), Federal Highway Administration, California Air Resources Board (CARB), Advanced Research Projects Agency–Energy (ARPA-E), and, of course, South Coast AQMD. Partnership projects with these agencies include more than \$140 million in total scope and effort. The projects' accomplishments include benefits such as fossil fuel reduction, tailpipe emission reductions, and safe operation of heavy-duty trucks. In 2016, VTA collected the "Distinguished Achievement Award" from the Vehicle Technology Office (VTO) of the DOE for its SuperTruck project and a 2020 Breath of Life Innovation award for its Volvo LIGHTS project. Volvo has consistently delivered timely and relevant work and product deployments to its public project partners, and South Coast AQMD is confident that the Switch On project will achieve similar project timeliness and success.

The seventy trucks will feature the battery electric Volvo VNR platform. Depending on battery pack choice and fleet preference, these trucks will be available to customers in a wide variety of configurations. Class 7 and Class 8 straight frame trucks will be offered in options covering a Gross Vehicle Weight (GVW) range from 32,000 to 65,000 lbs., and Class 8 tractors will be available in axle configurations of 4x2, 6x2 and 6x4 covering a GVW range from 65,000 to 80,000 lbs. Volvo's contribution of four truck configurations to accommodate various freight sectors is precisely the type of variety the end-user market needs in order to consider transitioning from diesel. Targeting urban, regional distribution, and drayage distribution means the project effectively covers the largest potential untapped market for heavy-duty battery electric trucks in the targeted area.

1A. Tactics to Achieve Significant, On-Going Emissions Reductions: Battery electric trucks are a very effective tool to provide NOx and PM 2.5 emission reductions to meet air quality standards in nonattainment areas. The South Coast Air Basin suffers from diesel fuel related air pollution and is ranked as one of the Top Five Most Polluted Areas for two of the three nonattainment categories. The South Coast Air Basin was ranked the most impacted nonattainment area for the 2015 8-hour Ozone standard with a design value of 111 parts per billion, and it was ranked the second most impacted on the 2012 annual standard PM2.5 nonattainment areas with a design value of 14.7 micrograms per cubic meter. South Coast AQMD has participated in dozens of technology demonstration projects that achieved near-zero or zero emission air quality benefits; but Volvo LIGHTS and the Switch-On project set these apart for a number of reasons: 1) the commitment from a large, global OEM to put forth product into commercial deployments rather than demonstrations; 2) the commitment from large fleets to transform their operations and rely upon the VNR platform to do revenue service truck deployments; and 3) the commitment from marketing, community outreach, and established maintenance and customer service support networks, ensuring that the project benefits far exceed the vehicles and timeline of this project alone.

Current Volvo LIGHTS fleet partners, Dependable Highway Express (DHE) and National Freight Industries (NFI), and other fleets participating in the Switch-On project including Anheuser Busch and Sysco recognize the value of partnering with Volvo for battery electric truck deployments due in large part to the brand awareness and brand

confidence of the VNR truck platform. In its Heavy-Duty Investment Strategy as part of its fiscal year (FY) 2019-2020 Low Carbon Transportation Investments Three Year Plan, CARB cited Volvo's use of its 185 kilowatt (kW) and 370 kW heavy-duty electric powertrain across its truck, bus, construction equipment, and marine equipment platforms as a way to improve its electric drivetrain performance through a single underlying architecture capable of serving multiple platforms¹. The Volvo VNR is renowned for making a quality and reliable product. Volvo LIGHTS enabled Volvo to establish a widespread network of electric vehicle customer service and maintenance support for the Volvo VNR—an aspect that is frequently overlooked in the emerging market for zero emission vehicles. Ensuring Volvo's reputation was put at the forefront in making a quality product, coupled with speedy maintenance and repair, means that fleets will be able to trust and rely upon their battery electric truck and depend on it in revenue service to displace their diesel trucks. This will enable a positive customer experience and customer testimonials, creating deepened confidence that the truck in fact can work in heavy-duty applications throughout the United States (U.S.).

Data collection and analysis from this project will produce valuable data that will serve to advance the heavy-duty battery electric truck market and enable improvements to Volvo's future product offerings and manufacturing processes. Funding from this project will also enable Volvo to sell the battery electric trucks to fleets in the state of California at a significantly more competitive price point, which is crucial to assist commercialization of heavy-duty battery electric trucks and offer fleets compelling options to comply with upcoming CARB regulations such as the Advanced Clean Trucks, Fleet Reporting, and Omnibus regulations. This technology will eventually address ozone issues in every state, and right now, Volvo is the only entity that can produce heavy duty battery electric trucks at this volume.

Volvo expects that the market will continue to expand production and deployment with continued availability of public funding from programs such as the Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP), Volkswagen (VW) Settlement, and Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer). While these trucks will have an incremental cost above the cost of baseline diesel trucks due to the additional cost of batteries and advanced technologies, Volvo is confident that continued air quality and GHG regulations and policies aimed at advancing the market penetration of zero emission vehicles, and other economic and political drivers, will continue to stimulate sales of battery electric trucks and drive down price. Furthermore, to make this project a valued showcase, the project and the integrated technologies will be communicated and shared in a way that facilitates understanding and encourages other fleets to move forward with zero emission truck purchases. Heavy-duty zero emission trucks are in their infancy, and while successful demonstration of their use in this project is important, it is only a first step. Fleets need to know that zero emission trucks are not only possible but desirable from an environmental and a business perspective. In order to expedite movement along the adoption curve from innovators to early adopters, lessons learned and best practices must be communicated and shared.

1B. Emissions Inventory & Progress Towards Attainment: The service areas of trucks at freight handling and logistics facilities include some of the most sensitive and environmentally impacted non-attainment areas where air quality improvements are needed most. Heavy-duty diesel trucking operations are often found in low-income and minority disadvantaged communities (DACs) where levels of diesel exhaust emissions are disproportionately high. Anheuser Busch, Sysco, DHE and NFI operate trucks in an approximately 60-mile radius around their distribution facilities in distribution, short haul, or drayage service to/from the Ports. As shown in Table 1 below, the vehicles will provide tremendous annual and lifetime emission reductions to the benefit of the surrounding communities.

Table 1: Estimated Emission Reductions and Diesel Conservation

Short Tons	NOx	PM2.5	HC	CO	CO2	Diesel
Annual	15.2631	0.1317	0.456	1.8377	5,316.0076	472,534
Lifetime	152.631	1.3175	4.5597	18.3777	53,160.075	4,725,340

South Coast AQMD and Volvo's Switch-On project is in a nonattainment area for air quality, with residents facing a disproportionate burden of harmful emissions such as NOx, volatile organic compounds (VOCs), and PM 2.5. Long

¹ <https://ww2.arb.ca.gov/sites/default/files/2019-09/fy1920fundingplan-appd.pdf>

term exposure to these pollutants and air toxins is known to cause harmful health effects, particularly to sensitive populations. Table 2 below lists the key air pollutant inventories, based on CARB 2016 State Implementation Plan (SIP) Emission Projection Data for heavy-duty trucks in the South Coast Air Basin. Emissions from these listed categories account for 20% of ozone precursors and PM 2.5 in the South Coast Air Basin².

Table 2: 2020 SIP Emission Projection Data (CARB) tons/day

Category	VOC	NOX	PM2.5	CO
LIGHT HEAVY-DUTY GAS TRUCKS – 1	3.44	4.28	0.12	13.67
LIGHT HEAVY-DUTY DIESEL TRUCKS - 1 (LHDDT1)	0.30	8.81	0.18	2.02
MEDIUM HEAVY-DUTY DIESEL TRUCKS (MHDDT)	0.57	16.01	0.76	2.02
HEAVY HEAVY-DUTY DIESEL TRUCKS (HHDDT)	1.50	55.51	0.63	8.66

This project will help address emissions from numerous relevant source categories. Table 3 below lists control measures from the 2016 South Coast Air Quality Mitigation Plan (AQMP) which will be affected by the deployment of battery electric trucks as part of this project. In addition to the immediate emission reductions and community engagement effects of this deployment, this project is poised to serve as a catalyst for the accelerated penetration of zero emission technologies throughout the South Coast Air Basin. Through its Clean Fuels Fund, South Coast AQMD supports a variety of zero and near-zero emission technologies as part of its portfolio approach to achieve the required 45% and 55% additional NOx reductions to reach attainment of its national ambient air quality standards (NAAQS). As part of a longer term strategy, South Coast AQMD partners with major OEMs such as Volvo to accelerate commercial deployment of the most promising zero emission technologies in source categories that have the greatest potential to achieve significant NOx and PM 2.5 reductions, as well as greenhouse gas (GHG) co-benefits. Heavy-duty battery electric trucks are important components of this strategy.

Table 3: 2016 South Coast AQMD AQMP Air Quality Attainment Measures³

AQMP Measure	Project Relationship
MOB-03: Emission Reductions at Warehouse Distribution Centers	Replacement of older diesel distribution trucks with new Class 8 battery electric trucks will result in NOx and PM 2.5 emission reductions from displaced diesel vehicles at DHE, NFI, and other distribution centers in the South Coast Air Basin, particularly in the DACs of Ontario and Chino.
MOB-05: Accelerated Penetration of Partial Zero-Emission and Zero Emission Vehicles	This project will add to the deployment of zero emission freight handling and goods movement at DACs in the South Coast Air Basin. It will serve as a proving ground for Class 8 battery electric trucks in distribution, short haul, and drayage applications. In addition, the project partners are best positioned to push the market forward by leveraging existing connections and serving as model fleet sites in zero emission freight handling applications.
MOB-07: Accelerated Penetration of Partial Zero-Emission and Zero Emission Light-heavy and Medium-heavy-duty vehicles	Commercial deployment of the production level Volvo electric VNR truck platform to the market will increase options for fleets facing compliance deadlines for upcoming CARB regulations and are in the market for new vehicles to begin meeting regulatory deadlines starting in model year 2024. Without a well-planned, high-visibility deployment by a major worldwide OEM, fleets are hesitant to trust new technologies for heavy-duty trucks. This project will validate the technology on a wider scale so that fleets may confidently make the switch to zero emission technologies and facilitate a price drop with increased adoption.
MOB-08: Accelerated Retirement of Older On-Road Heavy-duty Vehicles	With a viable zero emission truck on the market, fleets will be encouraged to retire their older diesel trucks. Fleets waiting for a commercially available zero emission Class 8 truck option will now have access to these trucks. Certification of these trucks through the CARB zero emission powertrain certification process and qualification for incentive funding such as HVIP, VW Settlement, Carl Moyer, and Prop 1B will reduce the price differential to fleets and make zero emission trucks more affordable. Outreach on the benefits of these technologies to residents and businesses in DACs will increase technology visibility and promote more sustainable policies for local governments in DACs where these freight handling and logistics facilities are frequently domiciled.

² <https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-iii.pdf?sfvrsn=6>

³ South Coast AQMD, 2016 Air Quality Management Plan, <http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan>.

Lastly, this project will directly support the EPA's Strategic Plan. South Coast AQMD and its project partners created its scope with the sole purpose of reducing emissions using new technologies that allow the same mode of operation without using diesel fuel. This project directly supports EPA's Strategic Plan - Goal 1, Objective 1.1: "Improve Air Quality" by directly improving the air quality where millions of southern Californians live and work. Given that the South Coast Air Basin has exceeded the established standards for healthy air on numerous documented occasions, this project puts South Coast AQMD in partnership with the EPA to support the attainment of the NAAQS by way of deploying electric vehicles. The project will result in the direct reduction of NOx, ozone, and particulate matter and will enhance the market for clean fuel technologies.

1C. Innovative Emission Reductions: In collaboration with the project partners, South Coast AQMD has created an innovative, well-conceived strategy that lays the foundation for proving that battery electric trucks in distribution, short haul, and drayage operations in the South Coast Air Basin will be successful. To back this claim and promote additional deployments, Volvo and its fleet partners will collect critical operational and cost data to enable streamlined transitions of heavy-duty battery electric trucks into fleet operations.

Innovation in vehicle technologies has always been an essential aspect of Volvo's company culture. Transportation electrification is here, and Volvo is leveraging everything it has learned from its innovative Volvo LIGHTS demonstration and deployment to convert more fleets into electric operation, reduce emissions, and to provide truly sustainable freight movement. Volvo currently has well over 100 patents pending in both the U.S. and Europe that are directly connected to electric vehicles, and they can be furnished upon request. The timing of this project corresponds well with the remaining time on the CARB Zero and Near-Zero Emission Freight Facilities (ZANZEFF) funded Volvo LIGHTS project, which is scheduled to release its first production level trucks in model year 2021 and is in the process of obtaining CARB's zero emission powertrain certification to allow sale of these trucks in California.

This project will include seventy Volvo heavy-duty battery electric vehicles with varying configurations that will enable true market penetration in goods movement. This innovative deployment project will benefit from the enhancements made to the first VNR electric platform in the Volvo LIGHTS deployment. Volvo LIGHTS is actively working on the four electric truck configurations delivered in this proposal, which will be equipped with the following driveline items:

- Two electric motors with 370 kW, 500 N-m max power (270 kW continuous power) with a Volvo 2-speed transmission.
- Typical electric range varies depending on the vehicle configuration, load, grade, speed, and state of charge. Typical maximum range expected is 200-250 miles.
- Energy storage: Depending on vehicle configuration, Lithium-ion batteries will have a minimum capacity of 264 kWh for value pack to a maximum capacity of 564 kWh.
- Charging: Combined Charging System (CCS) Type 2 with maximum charge power 250 kW direct current or high-power alternating current (AC) charging 44 kW. In this early stage of electrification, Volvo's charging interfaces and power capabilities are still evolving, and additional options are under consideration.

The battery chemistry used in the Volvo platform minimizes total cost of ownership (TCO) by balancing power requirements with charging cycles; sufficient power density is provided to prevent costly battery replacement from premature degradation and sufficient energy density minimizes the impact on payload capacity. By embracing a holistic view of the fleet's operations, including the route, and charging station locations, the optimal battery was devised to maintain or, in some cases, improve the fleet's productivity and duty cycle applications. All electric range will be improved by the amount of regenerative braking that occurs during a drive cycle, and driveline controls will include algorithms that anticipate brake events and maximize regenerative braking opportunities as well as minimize parasitic electric consumption by auxiliary components. Connected vehicle communication such as Volvo's EcoDrive 2.0 software will also assist in maximizing range, operation in zero emission mode while traveling in DACs using geofencing technologies and connected vehicle corridors near the Ports, aiding in eco-routing, and prioritizing the queue at Port facilities. The pre-cursor to this project, Volvo LIGHTS, built a comprehensive knowledge base on drayage truck operation in the San Pedro Bay ports, where Volvo has been evaluating plug-in hybrid electric vehicles (PHEVs) for

over five years. This proposed project leverages existing virtual models as well as over 12 months of data collected on PHEVs in drayage operations, enabling a jumpstart on concept simulation work with vehicle models that are already correlated with fleet test data and allowing the evaluation of high-resolution road cycles from real customer operation in areas targeted for demonstration. This data and modeling provide confidence in preventing unexpected performance issues from appearing late in the project.

The Volvo VNR electric truck platform is the first in the industry to supply real service and aftermarket innovation. Through this project, Volvo will continue to implement a variety of smart technologies to improve vehicle uptime via service and maintenance opportunities which were originally introduced with Volvo LIGHTS. The smart technologies utilized include: 1) Remote Diagnostics, which allows for enhanced proactive diagnostics, detailed analysis of critical fault codes for repair planning and streamlined service procedures; 2) Volvo Geofencing, which establishes a virtual perimeter (using global positioning system [GPS] coordinates) around fleet destinations for this project so all phases of service and maintenance needs can be monitored to ensure efficiencies by minimizing downtime; 3) Volvo's Service Management Platform, which is a simple, web-based tool that monitors vehicle status, provides electronic estimates, allows approval of repairs, issuance of purchase orders and direct dealer communication; and 4) Preventative Maintenance Plans, which improve vehicle uptime and increase productivity by making sure all required maintenance is done efficiently.

1D. Roles and Responsibilities: The project team has extensive experience working together, and each team member's role, personnel, and responsibilities are outlined in Table 4. South Coast AQMD's experience with Volvo in electrification of their product line began with the development of their hybrid platform on a partial DOE funded project. That design continued to develop through a CARB funded Greenhouse Gas Reduction Fund project on a plug-in hybrid electric diesel truck that will be completed in April 2021. South Coast AQMD is also working with Volvo on the Volvo LIGHTS project for battery electric trucks, which will also be completed in April 2021. In this proposed project, Volvo is taking the next step in electrification of its product line with a larger scale commercial deployment of battery electric trucks in the U.S. market.

Table 4: Roles and Responsibilities

Organization	Role	Key Personnel	Responsibilities
South Coast AQMD	Grantee; project administration	Matt Miyasato, Naveen Berry, Joseph Impullitti, Patricia Kwon	Grantee: Project administration and oversight, project planning, contract management, budget and payment tracking and oversight, reporting, data collection and submission oversight.
Volvo Group North America	OEM; project management	Keith Brandis, Samuel McLaughlin, Mark Burton, Johan Jinhage, Chad Burchett, Ola Styrenius, Henrik Engdahl, Jeffrey Zody, Dawn Fenton	Truck OEM; customer sales and manufacturing support. Launch commercialization and deployment for HDBEVs.
Energetics	Data Collection	Russel Owens, Ziga Ivanic	Capture fleet performance data and prepare analyses
DHE	End Use Fleet Operator / Site Owner	Troy Musgrave	Operate commercial trucks, provide end user feedback, support any access and testing of trucks, and oversee site improvements.
NFI	End Use Fleet Operator / Site Owner	Jim O'Leary, Bill Bliem	Operate commercial trucks, provide end user feedback, support any access and testing of trucks, and oversee site improvements.
Anheuser Busch	End Use Fleet Operator / Site Owner	Mark Young	Operate commercial trucks, provide end user feedback, support any access and testing of trucks, and oversee site improvements.
Sysco	End User Fleet Operator / Site Owner	Tracey Anderson	Operate commercial trucks, provide end user feedback, support any access and testing of trucks, and oversee site improvements.

Organization	Role	Key Personnel	Responsibilities
Reach Out	Community Based Organization (CBO)	Diana Fox, Josie Gaytan, Celina Lopez	Conduct community and stakeholder outreach and support community showcase events.

South Coast AQMD selected Volvo as its partner because of its: 1) expertise and experience in manufacturing and deploying quality Class 8 battery electric trucks; 2) ability to secure participation letters from fleet customers to deploy the battery electric trucks; and 3) cost share committed to the project. Volvo has already convened thirty of the region's largest commercial fleets and the local utility to discuss this truck deployment opportunity. Four fleets are committed to deploying the new battery electric trucks, two of which were involved in the Volvo LIGHTS project. Each of the partners – DHE, NFI, Anheuser Busch, and Sysco – will operate up to ten vehicles, leaving 30 of the 70 vehicles available for additional fleet partners. Volvo and South Coast AQMD have received tremendous interest from other fleet partners, and more than 60 well-known companies and current Volvo customers attended the Volvo LIGHTS showcase in Southern California in February 2020⁴. Following a project kick-off in February 2021, Volvo, and South Coast AQMD will finalize the selection of two or three fleets based on potential impact to DACs, alignment with the fleet's corporate sustainability goals, financial capabilities, and community engagement plans amongst other factors. Lastly, for outreach to the communities impacted by the project, South Coast AQMD will work with a partner such as Reach Out, the community engagement partner from the Volvo LIGHTS project. For data collection, Volvo has engaged Energetics to collect and analyze fleet data on vehicle performance, energy use, mechanical issues, operational costs, and driver impressions for the project.

2. Community Benefits, Engagement and Partnerships

2A. Benefits to Impacted Communities: DACs are disproportionately impacted by NOx and DPM, and the Switch-On project provides immediate relief to many of these areas in the South Coast Air Basin. The project includes facilities in DACs, and the project's heavy-duty battery electric trucks operate across a significant number of DACs in the South Coast Air Basin. The figures below are from the CalEnviroScreen 3.0 (CES) mapping tool for each fleet's facility, and Table 5 provides environmental and demographic indicators from CalEnviroScreen 3.0 and the EPA's EJSCREEN tool. Like EJSCREEN, CalEnviroScreen aggregates pollution and population data to score community burdens.

Figures 1-3 from Left to Right:

1. DHE's CalEnviroScreen Metrics
2. Anheuser Busch's CalEnviroScreen Metrics
3. Sysco's CalEnviroScreen Metrics

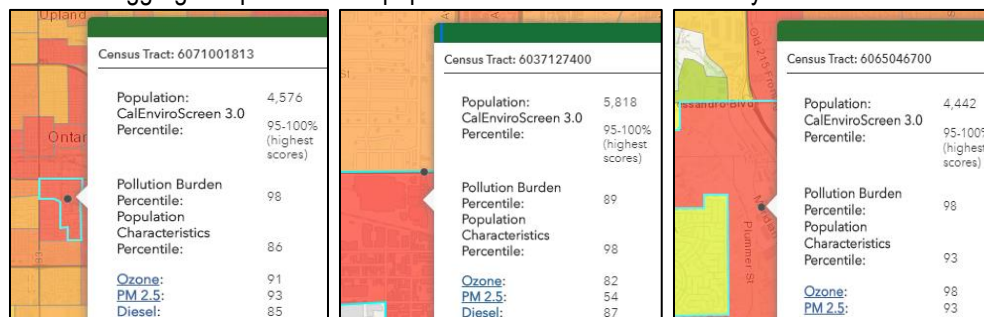


Table 5: EJSCREEN and CalEnviroScreen 3.0 Metrics

Fleet	Address	DAC	EJSCREEN PM2.5 %ile	EJSCREEN Ozone %ile	EJSCREEN Demographic Index %ile	EJSCREEN Minority Population %ile
DHE	1351 S. Campus Ave. Ontario, CA 91761	Yes	99	98	92	92
Anheuser Busch	15800 Roscoe Blvd. Van Nuys, CA 91406	Yes	92	96	92	89
Sysco	1570 Meridian Pkwy. Riverside, CA 92518	Yes	97	99	59	71
Sysco	20701 Currier Rd. Walnut, CA 91789	No	99	96	78	86
NFI	16047 Mountain Ave. Chino, CA 91708	No	99	97	70	83

⁴ <https://www.lightsproject.com/volvo-trucks-unveils-fully-electric-trucks-and-charging-stations/>

Regarding CalEnviroScreen 3.0, Sysco's Walnut location is not located in a DAC, and Sysco will prioritize deployments at the Riverside location to maximize the benefit to DACs. Further, the NFI Chino facility location is not directly considered a DAC by the guidance of SB 535, but its surrounding community is subject to 98% pollution burden and the vehicles that travel from the site operate heavily in DACs—especially those near and at the Ports of Los Angeles and Long Beach. DACs near this project will benefit from the immediate reductions in diesel emissions and increased community engagement with local businesses and residents. As part of the Assembly Bill (AB) 617 process, community members participating in community steering committees to draft their Community Emission Reduction Plans (CERPs) cited concerns with idling of heavy-duty diesel trucks driving on residential streets on their way to their freight handling facilities and to the Ports and the desire to have these replaced with zero emission trucks.

2B. Building and Leveraging Community Partnerships: The desired outcome of community engagement and partnerships is twofold. First, to have meaningful interactions with local businesses, organizations, and residents in the surrounding DACs, and second, to garner support of major fleets who will help accelerate adoption of battery electric trucks in California and throughout the U.S. Fleets must understand that heavy-duty battery electric trucks are reliable and will not reduce their productivity, and policymakers must understand how to overcome the obstacles to catalyze penetration of heavy-duty battery electric trucks in the marketplace. This project will enable both outcomes.

South Coast AQMD and Volvo will utilize several existing channels to engage communities. Reach Out, a local community-based organization, has been engaged to potentially continuing serving as the partner tasked with helping local stakeholders understand the economic and environmental benefits of the project for their future. Reach Out is part of the Volvo LIGHTS project team, and if confirmed as the outreach partner, this project will build off Reach Out's experience conducting community outreach that battery electric truck demonstration. Other outreach opportunities for this project include annual events such as the Riverside AltCar in October and the Advanced Clean Transportation (ACT) Expo in the summer. Community engagement is not part of the federal budget request for this project and will be completely funded through leveraged sources. Volvo and South Coast AQMD are applying for funding from the MSRC Program Opportunity Notice (PON) for Inland Ports to host a technology showcase event to raise visibility about the project and the underlying technologies through media coverage and live streaming. The event will be like past Volvo showcases, including the event held for the LIGHTS project in February 2020. The wide cross-section of California, national and international events provides the greatest opportunity for reaching fleet managers, planners, management, drivers and thought leaders needed to advance the heavy-duty battery electric market.

There are also community meetings and implementation activities from South Coast AQMD's implementation of the AB 617 program for the San Bernardino/Muscoy community, which also benefit the surrounding communities of Ontario, Chino, and Fontana in San Bernardino County. Many of the community meetings for the AB 617 program focus on communicating the benefits and challenges with implementing zero emission technologies in freight handling facilities in and around San Bernardino. Although residents in these DACs have pressed for using Community Air protection (CAP) funding for only zero emission trucks driving to/from freight handling facilities in their communities, residents are beginning to have a greater understanding that without the commercial availability of viable Class 8 zero emission trucks and OEMs capable of supporting these trucks during their infancy, deploying significant numbers of zero emission trucks is not feasible. Supporting the early commercialization of Volvo's Class 8 battery electric trucks will enable viable Class 8 battery electric trucks to penetrate the market more quickly and for residents to see greater numbers of these trucks in their communities as early as 2021.

3. Project Sustainability

This project is a continuation and acceleration into wholesale goods movement electrification, building off South Coast AQMD's and Volvo's successes to date in advancing the heavy-duty battery electric truck market. South Coast AQMD has successfully partnered with state and federal agencies as well as leading vehicle OEMs and suppliers to develop, demonstrate and deploy zero emission technologies. South Coast AQMD will continue to seek opportunities, through grant funding and other partnerships, to be heavily involved in accelerating the deployment of zero emission technologies in the heavy-duty sector. Volvo has similarly partnered with agencies, customers, and suppliers—around the world—to advance electromobility initiatives and commits to growing its product offerings in electrification. *This project is a*

critical step in enabling air quality improvements via product growth by solidifying early commercial deployments.

South Coast AQMD intentionally designed the Volvo LIGHTS and the Switch-On projects to generate significant progress toward true zero emission product deployments. This project takes significant strides toward realizing that vision and highlights fleet leaders and partners that will continue to provide widespread industry headlines and massive publicity. This type of publicity and communication about product offerings from global OEMs, combined with successful product experiences, will enable the impacts of this project to reach far beyond the scope of this project. By leveraging the Volvo Group's global experience and volumes of interest inquiries, the project will showcase the growing commercial viability of Class 8 zero emission trucks and provide a valuable achievement for air quality, climate change, petroleum reduction and transportation electrification goals.

Volvo has specifically targeted its heavy-duty battery electric truck VNR platform in three market segments that showcase the highest potential for converting to battery electric trucks: refuse, drayage, and regional distribution. Within each of these segments, and considering the price point offered by Volvo, there is a strong TCO case that can reduce a fleet's overall value of doing business in the transition from diesel to electric. Coupled with regulations and incentives, the ability to achieve cost parity with diesel is greater in California, but Volvo anticipates market penetration throughout the North American market, as well as globally. In fact, Volvo is gaining battery electric vehicle market momentum with its FL and FH chassis, which are currently offered for sale in Europe. Most of the powertrain components between the European and U.S. trucks are similar, reducing the price of common parts and improving market capitalization. The targeted market segments within the U. S. for this project include the following characteristics:

- *Regional distribution:* Regional distribution trucks distinguish themselves from long haul tractors in their physical shape as well as duty cycles. Regional distribution/short haul tractors are typically Class 7 and 8 tractors and straight trucks that often are built as 4x2 chassis. The regional distribution duty cycle consists of several delivery stops which result in significantly slower average daily speeds compared to tractors used in long haul and the added opportunity for regenerative braking.
- *Drayage/Port Trucks:* Drayage tractors are Class 8 heavy-duty trucks that frequent California's ports and intermodal rail yards and deliver containers to inland empire warehouses. These trucks have historically been 6x4 chassis due to the heavier loads required. There are approximately 22,268 drayage trucks operating in California, with most operating at the Ports of Los Angeles and Long Beach. While significant efforts have been made to reduce emissions at both ports, 96% of the drayage truck population remains diesel.

4. Environmental Results – Outcomes, Outputs, and Performance Measures

4A. Expected Project Outputs and Outcomes: With the objective of maximizing emissions reductions, the project will prioritize the electrification of existing diesel local freight trucks operating in the South Coast Air Basin. Battery electric trucks are the greatest emission reduction alternative to conventional diesel trucks, and South Coast AQMD is targeting deployments in DACs disproportionately affected by pollution related to goods movement. The target split by model type for the seventy trucks that will be deployed is as follows: 20 rigid Class 8 trucks, 30 Class 8 65,000-pound (lb.) tractors (15 single axle and 15 tandem axle), and 20 Class 8 80,000 lb. tractors. The expected emission reductions due to this fleet electrification project are shown below in Table 6. The underlying data (mileage, turn-in vehicle age, remaining useful life, etc.) used to calculate the emission reductions are available in the emission calculation attachment, and the tool used was the EPA's Diesel Emissions Quantifier⁵ (DEQ). The DEQ utilizes emission factors from MOVES2014, and the MOVES2014 emission factors are included in the attachment as well.

South Coast AQMD utilizes the Multiple Air Toxics Exposure Study V (MATES V) to monitor and evaluate emissions in the South Coast Air Basin. South Coast AQMD gathers measurements for carbon dioxide (CO₂), nitrogen dioxide (NO₂), ozone, PM₁₀, and PM_{2.5}: background level, pollutant transport, population exposure, representative concentration, source impact, real time modeling and trend analyses. South Coast AQMD produces reports based upon MATES V data and will continue to update these findings throughout the project period. Through its data collection partner, Energetics, Volvo, and its participating fleets will provide EPA with operational data to vehicle performance,

⁵ <https://cfpub.epa.gov/quantifier/index.cfm?action=main.home>

energy use, mechanical issues, operational costs, and driver impressions of the battery electric trucks.

Table 6: Anticipated Outputs and Outcomes

Outputs	Outcomes
Deploy 20 battery electric Class 8 4x2 60k lb. straight trucks	Annual Emission Reductions: 2.67 tons NOx; 0.0235 tons PM 2.5; 0.11 tons hydrocarbon (HC); 0.4069 tons carbon monoxide (CO); and 1250.1 tons CO ₂ e Lifetime Emission Reductions (Over 10 years): 26.738 tons NOx; 0.2356 tons PM 2.5; 1.099 tons HC; 4.0698 CO; and 12,501 tons CO ₂ e Diesel Fuel Reduced: 111,120 gallons annually and 1,111,200 gallons over vehicle lifetime
Deploy 15 battery electric Class 8 4x2 65k lb. tractors	Annual Emission Reductions: 2.667 tons NOx; 0.0241 tons PM 2.5; 0.0785 tons HC; 0.3186 tons CO; and 894.88 tons CO ₂ e Lifetime Emission Reductions (Over 10 years): 26.67 tons NOx; 0.2413 tons PM 2.5; 0.7846 tons HC; 3.18 CO; and 8,948.8 tons CO ₂ e Diesel Fuel Reduced: 79,545 gallons annually and 795,450 gallons over vehicle lifetime
Deploy 15 battery electric Class 8 6x4 65k lb. tractors	Annual Emission Reductions: 3.94 tons NOx; 0.0327 tons PM 2.5; 0.1054 tons HC; 0.4368 tons CO; and 1242.55 tons CO ₂ e Lifetime Emission Reductions (Over 10 years): 39.432 tons NOx; 0.327 tons PM 2.5; 1.0545 tons HC; 4.367 CO; and 12,425.5 tons CO ₂ e Diesel Fuel Reduced: 110,449 gallons annually and 1,104,490 gallons over vehicle lifetime
Deploy 20 battery electric Class 8 6x4 80k lb. tractors	Annual Emission Reductions: 5.978 tons NOx; 0.0514 tons PM 2.5; 0.1621 tons HC; 0.6754 tons CO; and 1,928.475 tons CO ₂ e Lifetime Emission Reductions (Over 10 years): 59.7819 tons NOx; 0.5136 tons PM 2.5; 1.6207 tons HC; 6.7543 CO; and 19,284.75 tons CO ₂ e Diesel Fuel Reduced: 171,420 gallons annually and 1,714,200 gallons over vehicle lifetime

In addition to these direct air quality benefits, the project will produce other outputs and consequent outcomes including:

- **Catalyzed Commercialization through Large-Scale Deployments:** Volvo has a strong commitment to transportation electrification and has developed a commercialization plan with regional distribution, drayage and refuse applications as prime targets for transportation electrification. These applications represent the lower speeds and fuel economies likely to benefit most from electrification. The business case analysis investigated the factors influencing the purchase of battery electric vehicles and includes policy, cost, performance, and customer preferences, i.e., brand loyalty. Coupled with Volvo's experience in providing a sustainable TCO for the vehicle, a successful electric truck platform for the U.S. market will be further solidified.
- **Acceleration of Widespread Adoption:** This project will result in not only additional vehicle deployments but vehicles in revenue service—truly displacing diesel trucks in operation. This is a critical step in the acceleration of the transportation electrification effort and a huge step for emission reductions. When the marketing and communications about this effort move forward, fleets will learn that these are real trucks that can be relied on for fleet operations. This will be a gamechanger for future goods movement in California and the U.S.
- **Positive Business Economic Impacts:** Volvo has targeted the three markets of refuse, drayage, and regional distribution because of the economic value to its customers. The on-road and off-road electric vehicle technologies have an initial cost (without incentives) that exceeds that of their diesel counterparts, but they provide a lower cost of maintenance and fuel (which can be even lower when combined with time of use electricity rates, low carbon fuel standard credits, and managed charging to reduce demand charges). This project will allow Volvo to finetune production and improve price points going forward, enabling cost parity with diesel to be reached more quickly.
- **Training and Workforce Development:** Finally, training for repair and service technicians will continue in this project, enabling ongoing workforce development, recruitment, and retention in clean advanced technologies—further stimulating the economy.

4B. Performance Measures: Measurable annual and lifetime results of this project are described in the Expected Outputs and Outcomes section above. The predicted results will be tracked against the actual results by lead project partner Volvo. South Coast AQMD will provide the EPA with quarterly progress reports and a final report, with input from project partners, on project milestones such as number of trucks deployed, any challenges and delays encountered,

updated timeline, funds expended, and other pertinent information based on the project timeline. Figure 4 below provides a visual of when key milestones will be achieved. Vehicle deliveries for the four identified fleet partners will be complete by the third quarter of 2022, allowing for at least a full year of deployment operations by the end of 2023.

Figure 4. Visual of Project Plan

	2020				2021				2022				2023				2024
Activity	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Start Project	■																
Kickoff Meeting		■															
Finalize Remaining Customer	■	■	■														
Review Vehicle Specifications			■														
Submit Vehicle Orders			■				■										
Build 20 Straight Trucks					5	5	5	5									
Fit 20 Straight Trucks					■	■	■	■	■								
Deliver 20 Straight Trucks					■	■	■	■	■								
Build 30 65k Tractors					5	10	10	5									
Fit 30 65k Tractors					■	■	■	■	■								
Delivery 30 65k Tractors					■	■	■	■	■								
Build 20 80k Tractors										5	10	5					
Fit 20 80k Tractors										■	■	■	■				
Deliver 20 80k Tractors										■	■	■	■				
Operation Period Reporting																	
Finalize Charger Installation Plans		■	■	■	■												
Upgrade Charging for Customer 1				■	■	■											
Upgrade Charging for Customer 2					■	■	■										
Upgrade Charging for Customers 3 and 4							■	■	■								

Performance measures for the Switch-On: A Large-Scale Deployment of Zero Emission Freight Trucks include:

- **Deploy seventy battery electric trucks.** Volvo will lead this task and track expenditures, monitor the project timeline, secure the supply chain, and obtain necessary approvals/certifications/registrations with state and federal agencies.
- **Identify and address air quality issues.** Volvo and South Coast AQMD will lead this effort. By leveraging existing relationships with local municipalities and a variety of other stakeholders and existing efforts such as MATES V, AB 617, and data collection efforts, project partners will document how air quality issues are being addressed in part by reporting on zero emission mileage being gained with the project compared to prior diesel emissions.
- **Engage with affected communities.** Volvo and South Coast AQMD will leverage existing relationships and efforts such as outreach activities funded by the upcoming MSRC opportunity, as well as AB 617 implementation in the Year 1 San Bernardino/Muscoy community. Performance will be tracked based on the number of organizations engaged, number of community meetings partners participate in, number of press releases; and number of questions/comments/concerns received.
- **Report on TCO learnings:** Volvo will lead this effort and provide its findings related to charging, maintenance, training, and other costs to create a refined picture of the TCO for battery electric trucks.
- **Disseminate project/technology innovation.** Volvo and South Coast AQMD will lead this task. Performance will be tracked based on number of organizations that receive outreach materials; number of social media and web posts and press releases; conference presentations.

4C. Performance Plan: South Coast AQMD, as the project administrator, will monitor Volvo and participating fleets on progress according to the project schedule, through project completion and close-out. South Coast AQMD has successfully managed several fleets and OEMs on similar projects. Experience includes relevant work deploying battery electric and fuel cell trucks in fleets and administering drayage truck deployment projects such as DOE's Zero Emission Cargo Transport (ZECT) 1 and ZECT 2, CARB's Greenhouse Gas Reduction Fund Zero Emission Drayage Truck (ZEDT) Program and Zero and Near-Zero Emission Freight Facilities Project, and the Daimler battery electric truck project funded by South Coast AQMD, the Ports of Los Angeles and Long Beach, and the EPA. The Output and

Outcome Tracking and Measurement Plans in Table 8 and Table 8 below show South Coast AQMD's method to efficiently and effectively ensure desired results are achieved.

Table 7: Output Tracking and Measurement Plan

Output	Tracking Plan	Measuring Plan
Deploy 4x2 straight trucks, 4x2 65k tractors, 6x4 65k tractors, and 6x4 80k tractors	Request quarterly status updates from Volvo and fleets	Compare actual progress to schedule to determine any deficiencies

Table 8: Outcome Tracking and Measurement Plan

Outcome	Tracking Plan	Measuring Plan
Annual Emission Reductions	Data collector to install data	Analyze data based upon approved data
Lifetime Emission Reductions (10-year life)	loggers to track agreed upon	collection plan including emission reductions
Diesel Fuel Conservation	performance metrics on fleet vehicles	based on actual vehicle miles travelled by fleet vehicles

4D. Timeline of Tasks and Milestones: Upon notification of award, South Coast AQMD and its partners will undertake the Tasks identified below in Table 9 to ensure successful implementation of the project. The project has a conservative start date of November 2020, and its expected completion date is well in advance of the five-year deadline.

Table 9: Description of Tasks and Timeline

Tasks	Task Lead	Timeline for Completion
Task 1: Agreement Execution and Kickoff		
1.1 Execute a grant agreement with EPA	South Coast AQMD	November 2020
1.2 South Coast AQMD Board approval	South Coast AQMD	December 2020
1.3 Kickoff meeting with EPA	South Coast AQMD	January 2021
1.4 Contract execution	South Coast AQMD	February 2021
Task 2: Specification Review and Pre-Build		
2.1 Finalize fleets for deployments	Volvo	February 2021
2.2 Execution of agreements with fleets, Energetics, other subcontractors	Volvo	March 2021
2.3 Finalize vehicle specifications for fleets	Volvo	March 2021
2.4 Finalize orders	Volvo	April 2021 – February 2020
Task 3: Manufacture Battery Electric Trucks		
3.1 Vehicle Build	Volvo	August 2021 – December 2022
3.2 Pre-delivery inspection and fit	Volvo	September 2021 – January 2023
3.3 Vehicle Delivery	Volvo	October 2021 – February 2023
Task 4: Monitoring and Reporting		
4.1 Quarterly Reports	South Coast	November 2020 – March 2024
4.2 Air Quality Benefit Analysis	South Coast	February 2023 – February 2024
4.3 Final Report	South Coast	March 2024

5. Programmatic Capability and Past Performance

5A. Management, Completion and Reporting Performance: During the last ten years, South Coast AQMD has been the prime applicant for dozens of successful, federally co-funded emission reduction projects. The organization's subject matter expertise and project management capabilities ensure that deliverables are completed successfully, and that reporting is complete and timely. Three recent and relevant federally funded projects are in Table 10 below.

South Coast AQMD is the air pollution control agency responsible for monitoring and regulating air pollution in the South Coast Air Basin and the Riverside County portion of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Basin comprises Orange County and non-desert portions of Los Angeles, Riverside, and San Bernardino counties. South Coast AQMD jurisdiction is the second most populous urban area in the U.S. and covers approximately 11,000 square miles with approximately 17 million residents. These areas include the first and fourth top polluted areas for ozone and the number two ranked top polluted area for PM 2.5. South Coast AQMD is also responsible for the development and implementation of the Basin's AQMP for the inclusion in the state implementation

plan (SIP) to attain and maintain the NAAQS for ozone and PM 2.5. The topography and climate of southern California combined with the growing population, increase in goods movement, San Pedro Bay Ports activities, and manufacturing, chemical, and refining industries make the Basin an area of high air pollution. Densely populated areas near intermodal facilities, the Ports, and certain industrial areas, have created several environmental justice areas.

Table 10: List of Federally funded assistance agreements similar in size, scope, and relevance

Title / EPA Agreement No.	Description	CFDA	Status	Reporting
Battery Electric Yard Tractor Replacement at Ports of LA and Long Beach (TA-99T48501)	The agreement (\$2.5 million) is to replace 16 LPG fueled yard tractors with battery electric yard tractors at the Ports of LA and Long Beach	66.202	On-going	Progress reports submitted on a quarterly basis
Shuttle Bus Replacement (EM-99T71501)	The agreement (\$3.2 million) is to replace conventional diesel and gasoline powered shuttle buses with zero emission shuttle buses in Southern California airports	66.202	On-going	Progress reports submitted on a quarterly basis
Daimler Develop Heavy-Duty Trucks with EV Infrastructure (A00909418)	The agreement (\$500,000) is to develop 20 heavy-duty battery electric trucks with EV infrastructure and energy storage to demonstrate real-world fleet operations in DACs	66.001	On-going	Progress reports submitted on a quarterly basis

South Coast AQMD has a long history of successfully collaborating with Basin stakeholders to reduce emissions from a variety of mobile sources and stationary sources. South Coast AQMD is successfully implementing several air quality incentive programs including the VW Settlement, Proposition 1B, the Carl Moyer Program, and the Lower Emitting School Bus Program. Through the Carl Moyer Program, South Coast AQMD has generated 7,954 tons per year of NO_x, 294 tons per year of ROG, and 232 tons per year of PM in the South Coast Air Basin, through the allocation of \$390 million in State funding. For the Proposition 1B, which entail more than \$458 million in State funding, South Coast AQMD spearheaded the deployment of over 6,595 zero and near-zero emission trucks, 25 ships at berth, three pieces of cargo handling equipment, and 20 locomotives, resulting in 42,798 tons of NO_x and 1,154.5 tons of PM 2.5 in the South Coast Air Basin⁶ for Years 1-5. In addition, under the Clean Fuels Program established in 1988, the South Coast AQMD successfully leveraged \$321 million in Clean Fuels funding for \$1.5 billion in projects, and managed numerous projects to develop, demonstrate and deploy various near-zero and zero emission technologies, as well as research, development, demonstration, and deployment of alternative fuel and clean fuels technologies. Over the past 32 years, South Coast AQMD has collaborated in partnership with other governmental organizations, private industry, academia, and research institutes and interested parties. Furthermore, South Coast AQMD has and is currently working on several EPA-funded projects, ranging from air monitoring programs to deployments of zero and near-zero emission vehicles.

In 2019 alone, South Coast AQMD's Clean Fuels Program executed 76 new and continuing contracts, projects, and studies in collaboration with a wide cross-section of industry partners. In early 2019, South Coast AQMD received a \$45 million grant from CARB for the Volvo LIGHTS project in partnership with Volvo to deploy 23 pilot and production Class 8 battery electric trucks. The first five battery electric trucks were delivered to DHE and NFI in January 2020. Other recent examples of South Coast AQMD's successful leadership includes the \$40.1 million Zero Emission Drayage Truck Demonstration Program. South Coast AQMD has continuously partnered with Tier 1 suppliers and industry collaboratives, universities, and utilities to pull in the necessary technical and financial resources necessary to advance product development, demonstration, and commercialization of vehicle technologies. South Coast AQMD has successfully partnered with both State and federal agencies as well as regional collaboratives to develop, demonstrate and deploy near-zero and zero emission technologies including two DOE-funded zero emission drayage truck projects to demonstrate various types of electric and hybrid electric drive technologies, an overhead catenary system using wayside power to support cargo transport operations, and a plug-in hybrid truck with a geo-fencing feature to operate in zero emission mode in DACs disproportionately impacted by diesel exhaust.

⁶ Emission reductions are calculated by CARB based on a 5-year equipment life for trucks and 10-year equipment life for ships at berth for projects funded in Years 1-3. For projects funded in Years 4-5, only the portion of emission reductions which are early or extra to existing CARB regulations is counted. https://ww2.arb.ca.gov/sites/default/files/2019-12/prop_1b_goods_movement_december_2019_semi_annual_report_to_dof.pdf

South Coast AQMD's successful implementation of these past and on-going projects demonstrates that it is preeminently qualified to lead this deployment project. Its dedicated, experienced staff will lead and provide assistance in the following South Coast AQMD efforts: defining the project scope, statements of work, timeline and payment schedule for contractors; directing and assisting administrative and legal staff on negotiating terms and conditions with contractors; executing contracts; performing project management oversight; and authorizing payment upon verification and approval of deliverables. At the request of EPA, staff can provide documentation and additional information of South Coast AQMD resources and abilities to execute this project. Contractors will be responsible for meeting program milestones and supplying all deliverables and reports. The proposed project will be implemented by South Coast AQMD Technology Advancement Office (TAO) and will employ the following approach in anticipating, responding to, and mitigating issues that may arise: 1) set reasonable deadlines; 2) set detailed contingency plans for predictable delays; 3) regularly review the project schedule and deliverables; 4) establish and maintain lines of communication with all team members; and 5) use delays as opportunities to re-think decisions that led to problems, take advantage of changing circumstances, and improve project deliverables. If an unforeseen delay occurs, South Coast AQMD will work with the project team to identify multiple solutions, including updating deadlines, modifying deliverables, and retaining additional resources as needed. To track and measure the project progress, contractors will be required to submit all information required by South Coast AQMD and EPA.

5B. Staff Expertise: Resumes for key personnel are included as an attachment with the application. South Coast AQMD's staff has more combined experience managing and administering grants for clean transportation projects than most public agencies in the U.S. South Coast AQMD's portfolio of expertise includes managing EPA grants, preparing and managing awards with commercial fleets, monitoring work progress, and showcasing successful projects. This project will be implemented by a Planning & Rules Manager, Program Supervisor, Financial Analyst, Air Quality Specialist, Staff Specialist, and Deputy District Counsel. Overseeing the South Coast AQMD team is Dr. Matt Miyasato, Deputy Executive Officer for Science & Technology Advancement. He is responsible for South Coast AQMD's Technology Advancement Office, Mobile Source Division, and Monitoring and Laboratory Analysis Division. Dr. Miyasato's principal charges are to stimulate development and commercialization of clean air technologies, develop, and coordinate mobile source regulations, and to conduct ambient monitoring, source testing and laboratory analysis.

Patricia Kwon is the Program Supervisor who will manage the proposed project. Her technical expertise is in program evaluation, statistics, socioeconomic analysis, and environmental policy. She has worked at South Coast AQMD for seventeen years and for nine years as a program evaluator of National Science Foundation ocean science education programs. Joseph Impullitti is the Technology Demonstration Manager whose duties will include managing the project under the supervision of the Program Supervisor. He has over 24 years of electric vehicle, hybrid vehicle and fuel cell powered vehicle design and development experience. Nancy Cole is the financial analyst whose duties include managing the fiscal and administrative aspect of the proposed project. She has over 10 years of experience managing administrative and financial aspects of federal and states grants including managing the financial aspects of the 2010, 2016 and 2017 EPA Targeted Air Shed Grant awards. A contractor will be selected by request for proposal (RFP) by South Coast AQMD to provide technical assistance to South Coast AQMD staff. The Deputy District Counsel will provide legal guidance throughout the planning and implementation of the project.

6. Leveraged Funding: To maximize emission reductions and the project's cost-effectiveness, South Coast AQMD's grant request focuses on the battery electric trucks. South Coast AQMD has secured voluntary cost share in the amount of \$10,080,00 and is leveraging other funding sources as shown in Table 11 below. Freight facility improvements and infrastructure from the LIGHTS project will be utilized by NFI and DHE, and the grant agreement for that portion of the LIGHTS project is provided with this application. Further, the budget accounts for \$490,000 for infrastructure for the other fleet partners. South Coast AQMD and Volvo are pursuing additional funding from the MSRC and DOE for infrastructure and outreach, and it is very likely that these funds will be obtained early in the project. Two pre-applications have already been submitted and the other will be submitted in summer 2020 if necessary. Volvo and the participating fleets stand ready to cover additional costs related to infrastructure should the funding sources not come through. The EPA's investment in the new vehicles will not be stranded by lack of infrastructure funding.

Table 11: Leveraged Funds and Contributions

Co-funding from Volvo*	\$ 10,080,000
TOTAL LEVERAGED FUNDS	\$ 10,080,000
MSRC Application (infrastructure and outreach)	\$ 3,400,000
ZANZEFF Award (facility improvements and infrastructure)	\$ 11,339,840
DOE VTO Application (infrastructure)	\$ 5,000,000
TOTAL OTHER LEVERAGED FUNDS	\$ 19,739,840

*Co-funding from Volvo may include funding from CARB's Zero Emission Drayage Pilot or from CARB's HVIP program. Volvo has committed to the full amount of \$10,080,000, which would be partially offset by CARB funding when secured.

7. Detailed Budget Narrative

EPA's funding (97.3% or \$19,460,000) is directed towards the battery electric trucks and infrastructure for fleet partners. Volvo will provide \$10,080,000 in voluntary cost share for the proposed project, as outlined in their commitment letter, and the entire investment including the other leveraged funds is nearly \$50 million as shown in Table 12.

Table 12: Detailed Budget

Cost / Class 8 4x2 60k Straight Truck: \$396,200 (x20)	\$7,924,000
Cost / Class 8 4x2 65k Tractor: \$396,200 (x15)	\$5,943,000
Cost / Class 8 6x4 65k Tractor: \$401,800 (x15)	\$6,027,000
Cost / Class 8 6x4 80k Tractor: \$457,800 (x20)	\$9,156,000
Funds Required for 70 Trucks	\$29,050,000
Request for Trucks	\$18,970,000
Request for Infrastructure	\$490,000
Request for Administration	\$540,000
Total Request	\$20,000,000
Total Leveraged (Volvo + MSRC + ZANZEFF + DOE)	\$29,819,840
Total Project Cost	\$49,819,840

7A. Procedures for Efficient Expenditures: Technical staff have the resources and expertise necessary to successfully implement the proposed project, including drafting contracts with appropriate terms and conditions, detailed task descriptions, and payment schedules tied to milestones to ensure all required tasks have been satisfied before any funds are dispersed. In addition, South Coast AQMD will closely monitor the progress of the project via conference calls, emails, meetings, and site visits as well as quarterly progress reports provided by project partners. Invoices are generally processed and paid within 30 days of receipt by the South Coast AQMD to ensure projects are not negatively affected by delayed reimbursements.

7B. Reasonableness of Budget and Budget Detail: South Coast AQMD's request of \$20,000,000 to deploy seventy new heavy-duty battery electric trucks is a reasonable and effective use of federal funds. Further, to minimize expenses related to administration and project management and maximize the EPA's investment in emission reduction technologies, only a fraction of the grant request (2.7% or \$540,000) is directed towards personnel and contractual costs. Table 13 displays an itemized budget displaying the amount of federal and non-federal funds for the project.

Table 13: Itemization of Costs

Line Items and Itemized Cost	EPA Funding	Non-Federal Cost Share
Personnel: (1) Manager @ \$75.11/hr. (80 hours)	\$ 6,009	
Personnel: (1) Program Supervisor @ \$63.42/hr. (1,800 hours)	\$ 114,156	
Personnel: (1) Air Quality Specialist @ \$50.41/hr. (100 hours)	\$ 5,041	
TOTAL PERSONNEL	\$ 125,206	
TOTAL FRINGE BENEFITS (57.48% of Salaries)	\$ 71,968	
Contractual: Volvo (70 electric trucks + charging infrastructure)	\$ 19,460,000	\$ 10,080,000
Contractual: Staff Specialist @ \$95.52/hr. (1,839 hours)	\$ 175,681	
TOTAL CONTRACTUAL	\$ 19,635,681	
INDIRECT COSTS (84.77% of Salaries & Fringe Benefits)	\$ 167,145	
TOTAL FUNDING REQUEST	\$ 20,000,000	
TOTAL COST (Federal and Non-Federal)	\$ 30,080,000	